

June 1961

EMO

NATIONAL DIGEST

Civil Defence — U.S.S.R.

A War Supplies Agency

Exercise TOCSIN — 1961

Women and Civil Defence

EMERGENCY MEASURES ORGANIZATION

THE EMO NATIONAL DIGEST

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The EMO NATIONAL DIGEST is published bi-monthly to provide current information on a broad range of subjects dealing with civil emergency planning. The magazine is published in English and French and may be obtained by writing to the Emergency Measures Organization, Privy Council Office, East Block, Ottawa.

In addition to publishing articles which reflect Canadian Government policy the Digest may also publish articles by private individuals on subjects of current interest to the emergency measures programme. The views of these contributors are not necessarily subscribed to by the Federal Government.

Director: *R. B. Curry.*

Editor: *A. B. Stirling.*

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

HIGHLIGHTS

IN this third issue of the EMO NATIONAL DIGEST there is a fairly wide variety of articles and comment with respect to civil emergency planning. There are several items of unusual interest.

The first has to do with matters of extreme importance to individuals in planning for their own survival and the survival of their families if nuclear war should occur. It is an introductory statement by the Prime Minister, the Right Honourable John G. Diefenbaker, reprinted from the newly published pamphlet "Eleven Steps to Survival". These eleven steps are set out inside the back cover of the present issue. The pamphlet itself is available through local emergency measures or civil defence offices.

Another item is the article on supply planning as it is being developed in the Department of Defence Production. This article gives a most useful summary of the work now being done to insure the best use and control of basic supplies in wartime.

A significant event in the last month has been the National Exercise "TOCSIN", to which reference was made in the second issue of the EMO NATIONAL DIGEST. The attention of readers is directed to the double page spread herein where pictures illustrating aspects of this exercise throughout Canada are shown. In a subsequent issue a full review of TOCSIN will be made and its results will be assessed.

It is considered useful for readers to be acquainted with the general nature and extent of civil emergency planning and training in other countries. In this issue, material taken from official sources in the U.S.S.R. is reprinted to indicate what is being done in the various parts of the Soviet Union. It is proposed to review, on later occasions, the plans developed in other countries as well, especially among our NATO allies.



*Reprinted from the recently published
EMO personal survival booklet
entitled "11 STEPS TO SURVIVAL."
(See inside back cover.)*

Recognizing that nuclear war would be a catastrophe for all nations, the Canadian Government has joined with other peace-minded nations in doing everything possible to prevent the outbreak of war. While in cooperation with nations in NATO and with the United States in NORAD, Canada maintains its defences to deter aggression, the Government has pursued a course of action designed to reduce world tensions, to bring about agreement providing for a settlement by peaceful means of international disputes, and to achieve disarmament with such controls as are necessary to preserve the security of all nations.

Notwithstanding what has been and is being done, nuclear war is possible either by the intended actions of evil madmen or by miscalculation. Should such a tragedy happen, hundreds of thousands of Canadians might be killed or injured and many cities and towns might be destroyed. On the other hand, many hundreds of thousands of Canadians who would otherwise perish could survive a nuclear war if preparations are made.

Little can be done to prevent damage to property; much can be done to reduce the number of casualties, to rescue and to safeguard the survivors against radiation.

An outline in general terms of what Canadians can and should do to guard themselves and their families against the potential dangers of nuclear war is contained in this booklet. Your personal survival can depend upon you following the advice that is given and the survival of many others may depend on how well you have heeded the advice contained therein.

Prime Minister.

March, 1961.

CIVIL DEFENCE—U.S.S.R.

The following is an extract from the Soviet Union's civil defence manual, (Chap IX) which was published in October of 1959 under the title "Defence Against Agents of Mass Destruction."

The book is designed for civil defence instructors and provides basic information concerning atomic, chemical and bacteriological weapons. Measures for individual and collective protection are explained at considerable length.

"Defence Against Agents of Mass Destruction" was produced under the editorial supervision of Candidate in Technical Sciences, V. P. Sinitsyn and G. A. Malinin.

Rules for Civilian Conduct and Action Following MPVO Directions

(MPVO—Local anti-air defence organization)

Self-defense groups are the primary MPVO mass formations. They are established in residential buildings of cities and workers' settlements, in state farms, machine tractor stations (MTS), machine tractor repair shops (MTM) and in other agricultural enterprises. In a rural area where the numerical strength of the population makes it impossible to establish self-defense groups, unitary teams are organized.

Self-defense groups (or unitary teams) are faced with a variety of tasks.

In peacetime, the self-defense groups and unitary teams take an active part in advance preparation of their assigned objectives for local anti-air defense and they also maintain property in a constant state of readiness. They also play an important role in conducting fire prevention measures in residential buildings and in industrial and public establishments under the leadership of fire-fighting services.

During a threatening situation, the self-defense groups and unitary teams maintain shelters in constant readiness and render assistance to the population in preparing and equipping covers; they transmit in time MPVO signals to the population, keep a close check on the observance of blackout conditions and on the conduct of the population in response to MPVO signals.

In case of an enemy air attack, the self-defense groups (unitary teams) observe the area in which they are stationed and transmit to MPVO chiefs on resulting damage. When centers of destruction arise, they render first aid to casualties among the population as well as veterinary aid to injured animals; they organize the evacuation of the population from centers of destruction and participate in combat activities of MPVO special units and formations. Insofar as possible, self-defense groups conduct operations aimed at eliminating the after effects of an aerial attack.

The self-defense groups (unitary teams) fulfill their tasks under the leadership of corresponding MPVO chiefs (house managers, chairmen of collective farms, directors of state farms, machine tractor stations, machine tractor repair shops, etc.).

In residential city areas and in workers' settlements at least one self-defense group is established per street committee and at least one such group per house management in government buildings.

One self-defense group is established in each collective farm, machine tractor station, machine tractor repair shop and at other agricultural enterprises.

In collective farms, self-defense groups are organized on the basis of one group per populated center of over 500 persons (adults). If the population of the collective farm includes 200 to 500 persons, a unitary team is set up.

Unitary teams are organized when the number of people in urban residential buildings and workers' settlements are not large enough to justify the organization of self-defense groups.

It often happens that it is not possible to organize a unitary team. In this case, individual MPVO posts are established, such as fire-fighting, order maintenance, medical, etc.

All problems concerned with the organization and recruitment of self-defense groups and unitary teams are resolved in accordance with the "Regulations Concerning Local Anti-air Defense Self-Defense Groups" ("Polozheniya o gruppakh samozashchity MPVO").

The number of self-defense groups and unitary teams and their deployment areas is determined in cities by city (rayon) MPVO chiefs, and in rural areas by MPVO chiefs of rural rayons and rural councils.

Of great importance in work with self-defense groups is the proper staffing of groups and teams and the performance of mass political and educational work among these groups aimed at increasing the combat readiness of their personnel.

It is well known that citizens of both sexes who are not subject to military draft or who have been deferred, including women between the ages of 18 and 50 and men between the ages of 16 and 60, are forced to serve in self-defense groups and unitary teams. When manning self-defense groups and unitary teams, it is necessary to bear in mind that persons who have temporarily lost their working ability due to illness or personal injury, invalids, pregnant women, and other citizens specified in the "Regulation Concerning MPVO Self-Defense Groups" are exempted from service in these groups.

Self-defense groups consist of a chief, his deputy for political affairs, a property manager, a communications officer, and the following teams: fire-fighting, antichemical, emergency-rescue, medical (two), shelters, preservation of order and security, and veterinary (established only when there are 30 to 100 head of cattle on a farm).

Each team is made up of a team commander, four to seven team members and a reserve (two men). Thus, a group consists of 48 men and 16 reservists.

The chiefs of self-defense groups and unitary teams are designated by the corresponding MPVO chiefs of the installations. The designation of the deputy chiefs for political affairs in self-defense groups is made with the agreement of local party organizations.

Self-defense groups (unitary teams) must be properly organized, staffed and well-trained. Their personnel are trained by committees of DOSAAF, the Red Cross Society and the Red Crescent Society. Commanders of these large-scale formations are trained at DOSAAF anti-air defense schools, while rank-and-file members are trained in their respective areas. The training is conducted in accordance with special schedules.

1. Duties of the Population Upon Declaration of a State of Emergency

In case of a threat of an enemy air attack against a certain area that may be subject to attack, a "state of emergency" (*ugrozhayemoye polozheniye*) is declared.

The duties of the population and the rules for conduct under conditions of a state of emergency are determined by decrees issued by city executive committees of the Soviets of Workers Deputies.

In a state of emergency, all citizens are obliged to follow the signals, announcements and orders issued by MPVO staffs and to accurately execute these orders.

The population should be familiar with the established MPVO signals such as "Air Raid", which is also the signal warning of an atomic attack, "Chemical Attack" and "All Clear."

Loudspeakers of the radio transmission network installed in living quarters must remain on at all times during a state of emergency in order to enable a continuous reception of MPVO signals, announcements and orders.

Every citizen should know the exact location of shelters and covers near the house in which he lives and also near the enterprise, institution or school where he works or studies.

In a state of emergency, it is necessary that each day with the advent of darkness all windows and openings through which light penetrates should be tightly closed with blackout curtains or shutters or draped with opaque fabrics.

In order to reduce the chances of possible fire hazards it is necessary to clear attics of rubbish and combustible objects, to remove from staircases and entrances all objects that are blocking the passage, to avoid the storage of fuel, kerosene and other combustible materials in premises and not to leave furnaces, primus and kerosene stoves, gas burners and other heating equipment unattended.

On leaving the house, it is necessary to switch off all electrical heating equipment. A supply of water in covered tanks, thermoses or bottles, should be kept in apartments.

Drinking water and food products must be stored in tightly closed containers or wrapped tightly in several layers of parchment paper and kept in closed closets or refrigerators.

At the time a state of emergency is declared, citizens should provide themselves and their families with individual means of protection, such as gas masks, paper capes, protective stockings and gloves, individual anti-chemical and first-aid kits, or should have improvised means of protection ready for use, such as cotton gauze bandages, rubber boots, overshoes or high galoshes, etc.

2. Duties and Behaviour of the Population Following an "Air Raid" Alarm

Following an "air raid" signal, all citizens must immediately leave their homes and go to shelters or covers, taking with them individual means of protection, a supply of food, and personal documents. People departing for shelters or covers should warn neighbors about the alarm and should render assistance to children, and old and sick people.

Prior to leaving for shelters it is necessary to switch off all heating equipment and electric lights, to close the gas valve leading to the gas main and in case furnaces are burning, to extinguish the fire with sand or water.

Workers and employees of industrial enterprises and establishments should follow the orders of their leaders when the air raid signal is given.

Classes are stopped in schools and the students move to a shelter or cover under the leadership of their teachers.

The air raid alarm signal may catch people in public establishments, such as theatres, movies, department stores. In this case, people should rapidly leave the establishment and should proceed to the nearest shelter or cover pointed out to them by the administration, the police or MPVO posts.

Following an air raid alarm signal, urban transportation (buses, trolleybuses, trolleys, automobiles and trucks) should come to a stop, and their passengers must quickly alight and take cover in the nearest shelters or refuges. If a refuge or shelter is not equipped for antichemical defense, it is recommended that people put on their gas masks in order not to be caught by surprise during an atomic explosion and also during enemy use of chemical and radioactive agents, pathogenic microbes and toxins.

It is possible that a person will not have time to take shelter when the air raid signal is given and will be caught in premises or on the street during an atomic

explosion. If at the time of an atomic explosion a person is located in some premises, he should quickly lie down on the floor behind a solid wall in order to avoid injury by fragments of glass and light emission. If an atomic explosion catches a person on the street, he should rapidly and without delay, take cover behind any kind of massive barrier, such as an embankment, stone wall, or local depression, etc., or in a ditch, or in a trench of an underground public works system, as well as in tunnels, etc.

However, it may happen that no suitable obstacles or covers are located nearby. In this case, one should not start running but rather one should quickly lie down on the ground, face downward, legs pointing in the direction of the explosion, and one should cover all exposed parts of the body and the head with a cape and remain lying for at least 15 seconds.

In all these cases it is necessary to act quickly, and to accurately and without panic follow the orders of MPVO posts.

When an air attack is over or has been repelled, the "All Clear" signal is given.

If, at the time of an air attack, the enemy has used chemical, radioactive or bacteriological agents, the signal "Chemical Attack" is given. Following this signal, all people outside of shelters or covers must quickly put on their gas masks, capes and other means of individual protection. Citizens located in shelters equipped for protection against chemical and atomic attack must remain in these shelters until special orders are given.

This requirement is due to the fact that the area near a shelter may be contaminated with chemical and radioactive agents or pathogenic microbes, and the presence of people in such sectors prior to their gas and radioactive decontamination or disinfection may result in severe and extensive injuries.

After an atomic explosion people are allowed to leave only such shelters which have been damaged or which are exposed to a danger of flood or fire. People located in undamaged shelters should not leave them without special orders from MPVO rescue crews or posts.

On leaving shelters and covers located in an area contaminated with chemical, radioactive, or bacteriological agents, it is necessary to observe the following rules:

1. People should leave only when wearing a gas mask; all exposed parts of the body should be covered with a cape; protective stockings (galoshes, overshoes) should be worn over footwear to protect the legs from chemical, radioactive, and bacteriological agents, and protective gloves should be put on.

2. It is necessary to rapidly cross a contaminated area following a route designated by MPVO posts or by the police.

3. Houses and buildings should not be entered, no objects or materials should be picked up and people should not stop, or sit and lie down, nor should they drink, eat, or smoke in a contaminated area.

On leaving a contaminated area, it is necessary, at some specially designated place, to first remove the protective cape and stockings (galoshes, overshoes) and then the gas mask and gloves. Hands, neck, face should be washed at the first opportunity, preferably with hot water and soap.

People who leave a contaminated area should undergo a dosimetric check, and those who are contaminated by a dose of radioactivity higher than the established norm are sent to sanitary treatment points, and their clothing is subjected to radioactive decontamination.

Following the directives of MPVO officials, all able-bodied citizens should take part in eliminating the after-effects of the attack, including such steps as the speedy removal of casualties and the gas and radioactive decontamination and disinfection of yards, streets, and houses. After this, living quarters and the objects located therein should be subjected to a gas and radioactive decontamination and disinfection.

Mr. Mack Dolgy, Central Zone Controller, Metropolitan Toronto Civil Defence Organization, reports that a total student population of 28,000 pupils, representing all secondary schools in the City of Toronto, have recently attended civil defence lectures.

Each lecture began with an introduction to civil defence and the reason why this organization is necessary. The lecturer went on to explain the Warning System, Fallout and the Shelter Programme. Evacuation was discussed briefly and a film—"Operation Cue" was shown. Following the film a few words were said on the necessary precautions to be taken before and after an attack. At the end of the lecture each student was given a handout which covered the various subjects studied.

Students were requested to take their handouts home and discuss the material with their families. It was hoped that in this way much useful survival information would reach parents and relatives also.

Mr. Dolgy ends his report by remarking that the programme was well received by the students and that Principals and Teaching Staffs considered the lecture worthwhile and interesting.

The Metropolitan Toronto Civil Defence Organization is to be congratulated for its initiative in arranging this programme, and for the competent manner in which it was carried out.

NATIONAL SECURITY

The following is an extract from an address by The Honourable Douglas S. Harkness, P.C., G.M., E.D., M.P., Minister of National Defence, to the Royal Canadian Military Institute, Toronto, Friday, February 17, 1961, 8:00 p.m. EST

"... I believe that the basic reason for so much questioning on defence matters is the underlying fear of the nuclear weapon. Unfortunately the hydrogen bomb is with us and we have to accept this as a reality. We must do everything we can to reach some form of disarmament but in the meantime the free world must also take steps to discourage anyone from using the bomb against us. I am inclined to believe that this fear of the present nuclear stalemate leads some people into "a head in the sand" attitude. By that I mean a refusal to face the fact that a nuclear war could conceivably come about. This in turn leads to an irritation on the part of those individuals because the government is planning defence measures to meet such an awful possibility, remote as it may seem. These individuals are the same people who generally refuse to participate in civil defence and emergency measures and have no desire to be reminded of such things.

On the part of others, this same fear leads to emotional demands that Canada not associate itself in any way with nuclear weapons and these people, by some weird intellectual gymnastics, come to the conclusion that if we disassociate ourselves from our allies no one will drop any bombs on us.

Of course the Canadian government wants to see a disarmament agreement reached and we are doing everything we can to that end. Of course we want to see a limitation of nuclear armaments but at the same time I do not think there is a single responsible student of defence in the Western world who will not admit that Soviet military aggression has been prevented in the past ten years by the nuclear deterrent in the hands of the United States and the United Kingdom. If Canada is to maintain her position of respect and influence in the councils of the world, she must continue to play her part in contributing to the combined strength of the West and in protecting the nuclear power which has prevented, and I believe will continue to prevent, a general war breaking out.

To those who think that a pacifist or neutralist posture will ensure our security I would refer them to Mr. Khrushchev's speech of last January. In that speech he spoke of peaceful co-existence but he also referred to the fact that the communists govern a vast area of the world and that they in turn will rule the whole globe. He termed this victory inevitable by the laws of

historical development. While we can perhaps vary in our interpretation of such statements, there is no doubt that force, and the threat of force, unfortunately continue to be a declared factor of Soviet bloc policy. Seriously, gentlemen, would unilateral disarmament by a country such as Canada, really seem to be the move to break the pattern of these threats? And do you see even the new nations making no provision for self or regional defence?

From Mr. Khrushchev's statements then and from many other events which we all know only too well, controlled disarmament seems, for the time being, to be some distance away, and man has not yet renounced threatening the use of force as an instrument of policy. Therefore Canada must have a defence policy designed to meet the needs of the present situation.

If our own leaders in the Western world have not made it clear, then certainly Mr. Khrushchev has made it perfectly clear that the free world is faced with a very intense ideological, economic and military struggle with the communist empires. Some people may take comfort in constant Soviet emphasis on peaceful co-existence, but when one examines what Mr. Khrushchev says he means by this term it can only be interpreted as a Soviet declaration of their determination to achieve world domination."

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In the April issue of the DIGEST an error was noted in the article on Federal Civil Emergency Planning Arrangements. The paragraph outlining the Order-in-Council P.C. 1959-656 dated 28 May, 1959, should have read:

Order-in-Council P.C. 1959-656 dated 28 May, 1959, gives the Department of National Defence primary responsibility for warning and assessment of nuclear attack and for re-entry and survival operations in damaged areas. The Department of National Health and Welfare has been relieved of its former primary responsibility and now assists the provinces in the organization and preparation of emergency health and welfare services. The Royal Canadian Mounted Police is responsible for assisting provinces and municipalities in maintaining law and order and controlling of traffic. Other federal departments have varying responsibilities arising out of their normal duties.

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PLANNING FOR A WAR SUPPLIES AGENCY

About the Author:

J. C. Morrison is the Director of the Emergency Supply Planning Branch, Department of Defence Production. In the opening paragraphs of the following article the author deliberately repeats previously published information (Civil Defence—Canada, Nov. 1960) in order to present the complete problem of emergency planning for a War Supplies Agency.



DURING the Second World War there were two federal agencies concerned with the problem of supply: the Department of Munitions and Supply, responsible for providing war materiel required by Canadian and Allied military forces; and the Wartime Prices and Trade Board, responsible for such control and regulation of supplies for civil purposes as the circumstances of those days required. Should Canada unhappily become involved in another major war, involving the use of nuclear weapons, the Government's intention is that a single agency, to be known as a War Supplies Agency, would be charged with full responsibility for all aspects of control over the production, distribution and pricing of supplies, both civil and military, with the exception of certain aspects of the agricultural and fishing industries. Production on the farm, including the provision of advice and guidance to farmers on the protection of crops, farms and livestock against war-time hazards such as radiation, would be the responsibility of the Department of Agriculture in a nuclear war emergency, as would agricultural inspection and regulatory functions related to the quality and wholesomeness of food, to its freedom from radioactive contamination, and to plant and animal insect and disease control. The catching, landing and processing of fishery products, up to the point where consumable fishery products enter either into storage or directly into distribution channels, would be the responsibility of the Department of Fisheries.

The Department of Defence Production has been given the task of making the various peacetime arrangements necessary to permit a War Supplies Agency to be brought into effective existence immediately on the outbreak of a nuclear war. To carry out this preparatory work, an Emergency Supply Planning Branch has been established within the Department.

The Problem

If Canada should ever be subjected to nuclear attack, the supply of essential goods and services for either civilian or military purposes would pose problems of a kind quite unfamiliar to governments and citizens alike.

There would be a need immediately for food, including special foods for infants; fuel, particularly for transportation purposes; materials for human use, especially clothing, shoes and blankets; repair materials and equipment for restoring such essential things as railways, public utilities, communications facilities, and roads; and medical supplies. Following the immediate shock of attack, to permit a start to be made on the task of rehabilitating homeless and destitute people, there would be urgent need of such additional things as simple building materials and tools, heating and electrical appliances, furniture, and household utensils.

Many of these vitally needed supplies could become scarce immediately after a nuclear attack for a variety of reasons. Some would be destroyed. The normal commercial distribution system could be dislocated by the dispersal of people or by the physical disruption of transportation and communications. Areas normally supporting only a small number of people might suddenly be inundated by evacuees from actual or potential target areas. There would be some tendency for people to buy all available supplies and hoard them. Imports might cease altogether, or at least be seriously curtailed.

The essential survival needs of the population during the first few weeks after a nuclear attack would probably have to be met in the main from surviving stocks of ready-to-use finished products rather than from the normal productive capacity of the country. Agricultural production could probably continue in

many areas, and industrial production might continue in some parts of the country; but most manufacturing and food processing, which tend to be concentrated in or near the large cities, could virtually cease for a time. Production in areas not directly affected or threatened by attack would be in danger of stopping before long for lack of materials or spare parts, or because of the widespread dislocation of transportation, communications, and financial arrangements. Any failure of electric power supply, because of damage or other reasons, would have immediate repercussions on production.

It might be noted, finally, that the difficulties of supplying the population with the basic necessities of life after a nuclear attack are likely to be further complicated by the presence of radioactive fallout, which could make surviving stocks of commodities and surviving production facilities inaccessible or unusable in many places for varying lengths of time and could seriously delay essential repairs to supporting services. Extensive areas of Canada could be affected by radioactive fallout even if nuclear attacks on this continent were directed exclusively at targets in the United States.

Functions of a War Supplies Agency

Within its general responsibilities for the control of supplies in the event of nuclear war, the War Supplies Agency is envisaged as having the following specific functions, not necessarily in order of priority:

- (a) Post-attack assessment of surviving resources, to determine the availability of food, fuel, survival and repair materials of various kinds, production facilities, raw and semi-processed materials, and so forth;
- (b) Assessment of supply requirements, based on claims submitted by other government departments and agencies; comparison of requirements with availabilities; reconciliation of competing claims; and establishment of priorities and allocation systems as required;
- (c) Arrangements for bulk redistribution of food, fuel, survival materials and other essential commodities;
- (d) Regulation of all internal and external trade, to whatever extent commercial activities might remain possible in the country as a whole or various parts of it, with respect particularly to rationing, price control, foreign trade, and accommodation;
- (e) Procurement by purchase, requisition, or other means of all goods and services required by Government for civil or military purposes;

- (f) Control of industrial production, including the allocation of raw and semi-processed materials, to whatever extent might be required;
- (g) Determination of general questions of policy with respect to the production and distribution of supplies under nuclear war conditions.

These, of course, would be wartime functions. The War Supplies Agency will have no functions in peacetime; indeed, it will not exist as a legal entity. The intention is that it would be brought into existence immediately on the outbreak of a nuclear war, presumably by Order-in-Council under the War Measures Act, and then given the necessary broad powers of control over essential supplies for both civil and military purposes.

Organization of a War Supplies Agency

Organizationally, the War Supplies Agency must conform to the arrangements being made through the Emergency Measures Organization for a decentralized system of emergency government with national, regional, zonal and municipal components. Moreover, the regional, zonal and municipal components of the War Supplies Agency must parallel the national, or central, component both functionally and organizationally, so that they could operate independently if cut off from higher authority. Each component, moreover, must be sufficiently flexible in its organization to permit rapid expansion and change, if required, once circumstances permit the beginning of a return to the more normal methods and facilities of government. It merits notice, also, that as but one segment of the total emergency government structure, the War Supplies Agency as a whole, and its various components, would have to work in very close cooperation with all the other segments of emergency government, federal, provincial or municipal, particularly with those having special supply problems such as the Emergency Welfare Services and the Emergency Health Services.

The organizational structure currently being developed for the War Supplies Agency is designed to meet the needs of the first few weeks after any nuclear attack (the Shock Phase) and is essentially interim in nature. There would be five main sub-divisions, called Administrations, within the War Supplies Agency in its interim form. Their respective areas of general responsibility would be as follows:

- (a) *The Food, Energy and Materials Administrations*, each responsible for a broad commodity area, would be concerned primarily with the availability of supplies, priorities for the

distribution of essential survival items, the possibilities of further production of such items, arrangements for bulk redistribution of food, energy, or materials, and general policy questions within their respective fields of responsibility.

- (b) *The Trade Administration* would have mainly regulatory responsibilities with respect to rationing, price control, accommodation, foreign trade, and control of non-essential commodities of various kinds, particularly in areas where normal commercial activity was not disrupted or could be re-established quickly.
- (c) *The Procurement and Industrial Production Administration* would be responsible for acquiring by purchase, requisition, or other means, all goods and services required by Government for civil or military purposes; also, it would provide the basis for such control of industrial production as circumstances might necessitate or permit.

These Administrations would all be represented at regional, zonal and local levels. However, the most suitable organization for any region or zone will depend upon a variety of factors, and each regional or zonal organization will have to be specifically designed to suit the particular circumstances involved. Similarly, at the municipal or local level, the detailed organization will vary from place to place. The larger cities may have to be sub-divided for emergency supply purposes and provided with a Local Supply Officer with supporting staff for each sub-division. The smaller municipalities, on the other hand, may require only a single representative of the War Supplies Agency; and some may need none at all, should circumstances be such that their requirements for supplies in an emergency could reasonably be met and controlled from a zone headquarters.

Supply Operations at the Local Level

Provision is being made for municipal, or local, components of the War Supplies Agency because it is precisely at this level that most of the anticipated problems of supply in a nuclear war emergency will first arise and have the greatest impact. Considering the extensive disruption of communications that may occur at least temporarily, it is considered essential that those responsible for carrying on local civil government after a nuclear attack should have available to them in a physical sense the immediate support of the federal agency authorized to exercise full control over supplies of all kinds in whatever manner circumstances might require. Otherwise, there would be serious risk that in areas having an urgent need for supplies the

local authorities would be unable to obtain them while elsewhere surplus stocks were being unnecessarily dissipated through the inability of local authorities effectively to exercise control over them.

The precise role of the municipal components of the War Supplies Agency, in other words the type of assistance they might be called upon by the local authorities to provide, or, alternatively, the action they might consider it necessary to take independently, would vary considerably from one place to another depending on circumstances. Physical destruction would not be universal following a nuclear attack. Some cities might be destroyed in whole or in part, or severely damaged. Large sections of the country could be seriously contaminated by radioactive fallout from nuclear detonations over targets in either Canada or the United States. Other areas might remain relatively or completely unaffected by the direct effects of attack. Since it is impossible to predict with any certainty what particular circumstances would apply to any given city, town or other municipality, it is necessary in planning the operations of the War Supplies Agency at the local level to prepare for any one of several possible contingencies or combinations of them.

To illustrate the problem, let us assume somewhat arbitrarily that the country would be divided into areas of three types in the period immediately following a nuclear attack:

- (a) Areas devastated by nuclear explosion and/or heavily contaminated by radioactive fallout ("A" Areas);
- (b) Areas of fallout contamination less than "heavy" ("B" Areas);
- (c) Areas wholly unaffected physically by a nuclear explosion ("C" Areas).

According to the present allocation of governmental responsibilities in the event of nuclear war, it would be the responsibility of the Army to assume control of "A" Areas. Depending on the exact situation, the Army might have to exercise jurisdiction over all persons and things in such areas, including supplies, until such time as civil authority could be reconstituted on an effective basis, which might take some time. The War Supplies Agency, through zonal or municipal components, might or might not be able physically to exercise effective control of surviving supplies in "A" Areas or to assist the Army in doing so. In any event, the chief task of the War Supplies Agency with respect to such areas initially would be to meet supply claims for the support of the military forces committed to the areas and such surviving civilians as might have to be cared for temporarily within these areas by the Emergency Welfare Services, the Emergency Health Services, or the Army itself. Mass care would undoubtedly be necessary for most civilians remaining temporarily in

Continued on page 12



At Camp Petawawa, Ontario, the Minister for National Defence, The Hon. Douglas S. Harkness, leaves the special train which carried key federal government representatives from Ottawa.



Exercise Tocsin in Nova Scotia meant heavy traffic at the teletype machine for Signalman Edward Doherty of Dartmouth.

EXERCISE T



At Camp Shilo, Manitoba, a stockpile of medical supplies are inspected. Lt.-Col. A. G. McLaren, Area Medical Officer (left) discusses how stores would be used with (left to right) W. H. Jorgenson, MP for Provencher and Parliamentary Secretary to the Federal Minister of Agriculture; Manitoba Industry and Commerce Minister Gurney Evans; Colonel J. P. Marriott, Commander Camp Shilo; Brigadier J. C. Pangman, Commander Manitoba Area; Warrant Officer J. L. Purcell, a pharmacist stationed at Camp Shilo.



In Regina, Saskatchewan, Station Manager Mr. R. H. Roberts, briefs his producer Bill Liska (right) on an emergency broadcast.

TOCSIN 1961



In Fredericton, New Brunswick, the younger generation participated in Exercise Tocsin. Mr. L. R. Wade, a civil servant with the N.B. Area Signals Squadron, passes a teletype message to one of the Boy Scouts who acted as runners during the exercise.



In Calgary, Alberta, District Director of Postal Services, Mr. L. J. Watson, discusses the deployment of troops with Colonel E. T. Monroe, Commander Calgary Garrison.



Mr. R. C. Weston, Co-ordinator Joint Staff, is shown in the emergency government building at Camp Petawawa. In the background are two attractive members of the Emergency Measures Organization staff. Left to right: Miss Jean Blinkhorn and Miss Marina Beauchamp.



In St. John's, Newfoundland, Mayor H. G. R. Mews (foreground) discusses a message with a member of the Emergency Measures Organization staff, Cdr. E. B. Pearce.

—Photos by DND.

"A" Areas, and supplies for this purpose would necessarily have to be in bulk form and be drawn from surviving stocks within practical road transportation distance. Distribution of food and other essential supplies on an individual basis would be quite impossible in "A" Areas, and traditional supply devices such as rationing would probably remain impracticable in such areas for months under the best circumstances.

The local civil authorities would be expected to remain in control of "B" Areas, but both they and the populations of these areas would be immobilized for at least several days by radioactive fallout, depending on the intensity of the contamination. During this period of immobility, people would have to stay most of the time in shelter and would be dependent on their own household stocks of food and other necessities available at the moment of attack. However, after a few days it would become safe to emerge from shelter for increasingly longer periods, and at this point in time, possibly within three or four days of the attack, the War Supplies Agency at the local level would hope to be in a position to exercise effective control over the distribution of essential supplies on an individual or family basis, through some form of rationing however rudimentary, to permit some replenishment of household necessities. As a preliminary to such a step, of course, the War Supplies Agency would have to assume full control of the use and disposition of what might be "on the shelf" in local retail and wholesale outlets.

The War Supplies Agency would be confronted in the unaffected or "C" Areas of the country with much the same basic supply problem as in the "B" Areas. However, because of the absence of fallout, the sequence of events leading to the initial form of rationing would be dependent in time not on the necessity of people remaining in shelter for some days but rather on the speed with which the War Supplies Agency could assume effective control over retail and wholesale stocks. During the time required for this purpose, stocks might have to be "frozen" to prevent their wasteful dissipation, and during any such interval households would have to manage on their own accumulated stocks in the same way as those in "B" Areas who would be confined to shelters.

In the unfortunate event of an actual nuclear attack, of course, there would not be anything like the clear-cut distinction between areas that has been drawn here for the purpose of illustrating and analysing the operations of the War Supplies Agency at the local level. The degrees of damage and the patterns and intensities of fallout would have such variations that local components of the War Supplies Agency must of necessity be left with wide discretion as to the most appropriate action within a particular jurisdiction, or part of it, and the correct timing of that action.

A further complication is that in both "B" Areas and "C" Areas there could be large numbers of evacuees, many of them possibly sick or injured, to be

cared for by the civil authorities. The sick or the injured would be the responsibility of the Emergency Health Services, while other evacuees would become a charge on the resources of the Emergency Welfare Services in the first instance. To feed and otherwise meet the material needs of the evacuees, these Services would be expected to make claims on the nearest component of the War Supplies Agency, either independently or through a supply organization. It would then become the responsibility of the War Supplies Agency to satisfy these claims as far as possible by arranging for the delivery of bulk supplies at medical and welfare centres or at a designated supply depot. If the latter type of arrangement is contemplated by local authorities, so that municipal demands on the War Supplies Agency could be coordinated, it is suggested that the municipal office normally responsible for purchasing might be made the focal point and planning agency for a municipal emergency supply organization.

As arrangements could be made to absorb evacuees into the homes of residents of "B" or "C" Areas through billeting, or to place them in congregate accommodation having housekeeping facilities, it would probably become feasible for the War Supplies Agency to extend its rationing system to cover these evacuees. Depending on the circumstances of the moment, however, this process could take considerable time; and it would thus appear most desirable that all local authorities in planning their welfare activities under nuclear war conditions should take into clear account that mass care arrangements, particularly mass feeding, might be necessary for the majority of evacuees for quite a number of days. In various places, under certain conditions, it might be physically impossible for the War Supplies Agency to arrange immediately for the distribution of food and other supplies on an individual or family basis through retail outlets; and since such a system of distribution would be a prerequisite of even a rudimentary rationing system, the only alternative in such instances with respect at least, to evacuees, would be bulk distribution and mass care including feeding.

Two points about the operations of the War Supplies Agency at the local level might be stressed particularly. First, it would be the agency of federal emergency government to which all municipal or local services would turn for support once municipal-owned supplies were exhausted, and the agency also to which local governments would look to exercise effective control over supplies in commercial premises, both retail and wholesale. Secondly, the success or failure of War Supplies Agency operations at local level, and in turn the success or failure of the inhabitants of any community in avoiding serious hardships through lack of essential supplies, may well turn on the extent to which households make a positive effort in peacetime to accumulate reserve stocks of essentials, particularly

food. If every household in the country stocked, preferably in portable form, two-weeks extra supply of food, medical supplies suitable for first-aid purposes, water, and any other essential items peculiar to the household, this in itself would go a long way towards ensuring a successful solution to the civilian supply problem in the event of a nuclear attack. At worst, most of those who survived would be in no immediate danger from lack of food or other necessities, and this would have important psychological and material effects that would be of tremendous assistance to the various agencies of emergency government charged not only with meeting the immediate needs of the population after attack but also with establishing an orderly control over essential supplies sufficient to permit the early rehabilitation of the economy and its eventual reconstruction.

Staffing the War Supplies Agency

The responsibilities that would devolve upon the War Supplies Agency are in peacetime divided among a number of federal departments and agencies, notably the Departments of Defence Production, Trade and Commerce, Agriculture, Fisheries, Mines and Technical Surveys, the National Energy Board, the Dominion Coal Board, and the Central Mortgage and Housing Corporation. Hence the staff of the War Supplies Agency is to be a composite one drawn from a variety of sources, including non-governmental organizations. The persons required for this staff will be selected on a stand-by basis in peacetime, briefed, and given as much opportunity as possible through exercises and other means to gain some experience of their wartime duties.

The staff of the national component of the War Supplies Agency will be composed in the main of persons normally employed in the Ottawa offices of the above-mentioned departments and agencies having peacetime responsibilities and expert knowledge in the supply field. Persons to staff the regional, zonal and municipal components of the Agency will be drawn to some extent from the field staffs of these same departments and agencies. However, it would appear both necessary and desirable also to draw on provincial resources for this purpose as well as on qualified persons in business, industry and other fields.

Planning Programme

Planning priority is being given to four projects:

- (a) Further and more detailed development of an organizational framework for the War Supplies Agency and selection of persons to staff it;
- (b) Collection of inventory data on major stocks of food, fuel, and essential survival materials,
- (c) Tabulation of these data in a form suitable for use in the aftermath of any nuclear attack to determine the quantities and locations of surviving supply resources;
- (d) Preparation in draft form of the legal instruments likely to be necessary to permit the effective control and use of these surviving resources.

There are of course many other aspects of emergency supply planning requiring and receiving attention, and it is hoped to discuss some of them in one or more later articles. For the moment, at the risk of over-emphasizing a point made earlier, the reader is invited to ponder the extent to which individual citizens and private business concerns should themselves undertake to make at least modest provision for their own supply needs in the event of nuclear war. Governmental preparations, complete as one might hope them to be, are unlikely to prove fully equal to the occasion unless they are complemented by private action.

* * *

The report on the International Rescue and First Aid competition appearing in the February issue of the EMO NATIONAL DIGEST erroneously stated that the winner of the First Aid competition was entered by the Metro Toronto Civil Defence. The correct sponsor of the winning team was the Ontario Council, St. John Ambulance.

* * *

Soviet grain is found highly radioactive

All imported foods into Britain are checked as a safeguard to the British consumer, and recent measurements on Russian flour have shown it to be particularly radioactive. This announcement was made recently by a British radiological laboratory—a department of the British Agricultural Research Council—who had discovered that Soviet grain imported into Britain contained five times as much Strontium-90 as grain from North America.

The units of measurement are microcuries of Strontium-90 per kilogram (2.2 pounds) of the tested product. Flour from Russian grain had shown 23 units, compared with the North American flour's radioactivity of 4, the laboratory said.

(From *New York State Civil Defence Newsletter*, January 1961)

THE ROLE OF WOMEN IN CIVIL DEFENCE

Nurse Noma Taylor, who has prepared the following article, is the Provincial Nurse Consultant for Civil Defence in Nova Scotia. Miss Taylor is a graduate of the Ottawa Civic Hospital School of Nursing and a post-graduate of the University of Toronto.

SINCE my appointment as Provincial Nurse Consultant to Civil Defence in Nova Scotia, I have been asked many questions about civil defence by a great number of women.

The "EMO National Digest" has asked me to select a number of questions and answers which I feel might be of interest to other Canadian women.

Probably the most frequent question asked is "Just what is Civil Defence?"

I explain that civil defence is simply a function of government, whether it be Federal, Provincial or Municipal. It is a method of preparing, by pre-planning and pre-training at all levels of government, for the extension of normal community services during an emergency.

This answer is often followed by "What can women do to help and what training is available?"

I reply that many courses are available, either through the local civil defence organization or through the Canadian Civil Defence College, Arnprior, Ontario. Courses can be taken in Home Nursing, First Aid, Welfare, Emergency Feeding, Registration and Inquiry, and Personnel Services.

The most important thing that Canadian women can do is to educate themselves and their children in self-help and self-protection measures. For this purpose a great deal of useful literature is available on request from Provincial Civil Defence or Emergency Measures offices.

"But what about my family if I enroll in civil defence or take a civil defence course?"

A mother's first responsibility is to her family, and to leave them unattended would be wrong. Remember, much can be accomplished at home by self education and as far as enrolment is concerned it is useful to enroll even though it may not be possible to take an active part in civil defence activities. The mere fact that women with particular training or skills are registered and could be located in an emergency is of definite value.

"What happens if my children are in school when something happens?"

This is a difficult question to answer because planning will vary from community to community. In many areas emergency planning for school children does not exist. In other localities considerable progress has been made. Communities which have a plan propose to send

children home if time permits. If it doesn't, children will be directed to the school basement where they will be cared for until further direction is received. I point out that it is the parents' responsibility to see that adequate plans are prepared and ready.

"What other responsibilities, as a mother, would I have in case there is a national emergency?"

The Emergency Measures Organization has recently published a booklet called "11 Steps to Survival" which describes in detail what every mother can do for herself and her family before and during a national emergency. This booklet is available from Provincial Emergency Measures or Civil Defence offices.

"What can I do", mothers ask, "to make sure that my children's health can withstand any dangers an emergency might bring?"

First, and most important, is a well balanced nutrition which builds up body resistance to infection.

Secondly, make sure that your children's inoculations are up-to-date. Every mother should keep a record of her children's inoculations and not depend on the public health nurse or the VON. Sometimes, particularly during the summer holidays—and the same thing could happen during an emergency, records are not available when needed.

Remember also, that during a disaster immunization against polio and tetanus is essential.

Finally, I always answer the question "What can we, as women in the community, do about emergency planning?" by saying that Canadian women are recognized as the most influential group in the country. A strong and united demand for effective emergency planning will undoubtedly produce results—but to make any planning effective will require the wholehearted support of all Canadian women.

In closing, I would like to repeat a statement by the United Nations and the World Health Organization, who have said: "In view of world conditions, every country, every town, and every home should learn a programme of 'self-help for emergencies'".

I personally am convinced that every home in Canada should have one person at least trained in First Aid or Home Nursing—and preferably both.



1. WHY A FALLOUT SHELTER

If nuclear war comes, the greatest danger to the greatest number of Canadians is likely to come from radioactive fallout. Fortunately, this danger can be averted or considerably reduced by the use of comparatively simple measures.

To understand how you can protect yourself against fallout, you must know something of its nature.

When a nuclear bomb explodes so that its fireball touches the ground, a considerable amount of earth and other pulverized material is drawn up into the cloud, becoming radioactive in the process. This dust is carried downwind and may be deposited over thousands of square miles of territory. After it has fallen onto the ground or buildings it still continues to emit radiation which cannot be detected by the human senses but is harmful to the human body.

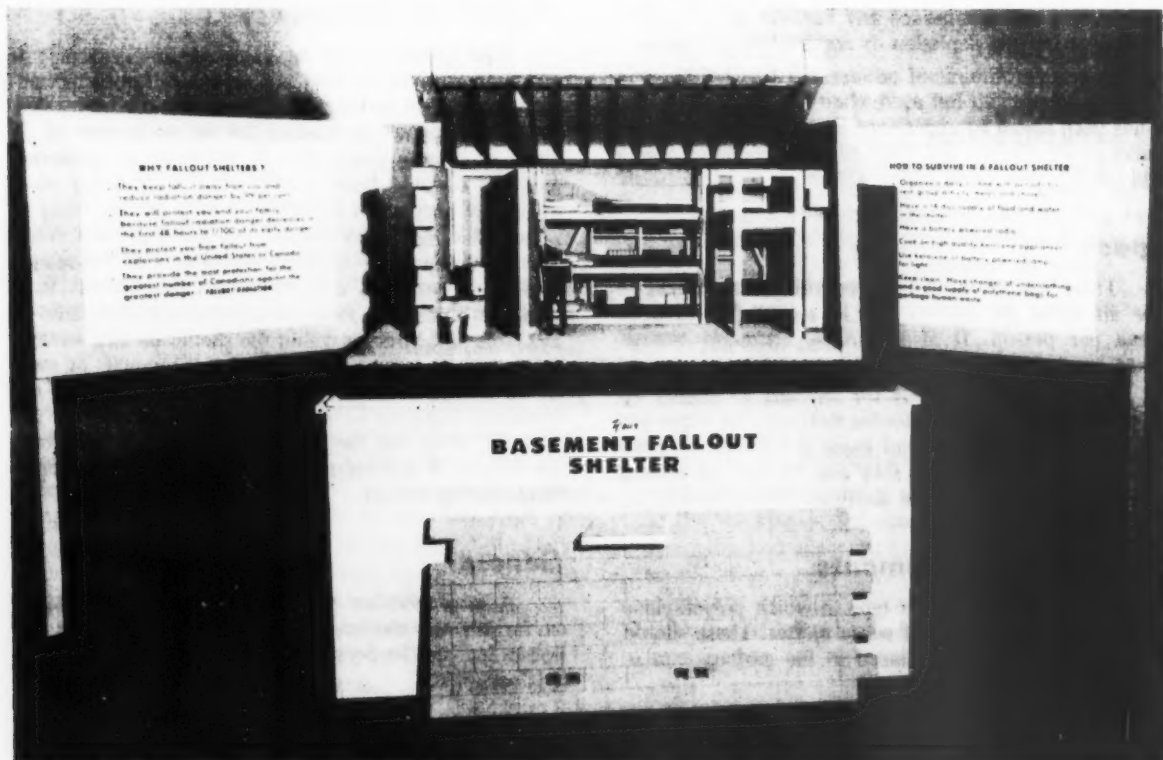
For people outside the immediate blast area, one of the greatest dangers may be this radioactive dust. So we should keep such dust away from us.

From a study of radiation we know how to protect ourselves against it. We know, for example, that the

further one is from any source of radiation, the less one is affected by it. Then, while radiation can pass through walls and other solids, we know that the denser the obstacles it encounters the more its intensity is reduced. That is to say, a solid brick, or stone, or concrete wall will reduce radiation effects more than wooden walls of the same thickness. So, by placing some type of heavy construction between ourselves and a source of radiation, such as radioactive fallout dust, we can achieve a considerable amount of protection.

Finally, fallout radiation decreases with time; its strength is reduced day by day. So one method of survival open to us is to stay in some form of protected accommodation until the radiation intensity has dropped to the point where it is safe for us to resume a more normal pattern of living.

Because the greatest hazard to the largest number of Canadians, in the event of a nuclear war, would be radioactive fallout, fallout shelters are a practical measure for survival.



A scale model of the basement fallout shelter. Similar models have been distributed to each Province by the Federal Emergency Measures Organization. The models will be used for demonstration purposes at lectures, exhibitions, etc.

FACTS ABOUT THE BASEMENT FALLOUT SHELTER

Protection

The shelter has been designed to give adequate protection in the basement of a light stud-frame construction house. In this type of construction, the shelter will have a protection factor of approximately 100.

It will not give protection against blast or fire.

There is no requirement to install filters in the ventilation system. Fallout dust will not normally penetrate to the basement if the doors and windows of the house are closed in the normal way. If a small amount of fallout dust should get in, it will still be insignificant in relation to the gamma radiation penetrating the walls from outside.

Ventilation

With this type of shelter, there is *no requirement for forced air ventilation*. The normal air circulation is induced by the heat emanating from the occupants, cooking, lighting and the shelter heater, if required; and is controlled by means of the curtain hung across the doorway.

The use of one gallon of fuel per day for cooking and heating will not induce any harmful effects, either by way of oxygen depletion or combustion products.

A certain amount of odours will be carried away in the circulating air but even when this is not complete, it has been found by experience that after relatively few hours in the shelter, the sense of smell becomes dulled and odours tend to be imperceptible.

Space

The shelter is designed to provide 80 cubic feet of free air space per person and 12 square feet of floor space per person. It also includes adequate storage space for food supplies.

This type of shelter is for any size of family up to 5. For 5 persons, one double-tier and one triple-tier bunk are recommended and these should be supplied with hinged backs so that they can be used as seating accommodation during the daytime.

Sanitary Arrangements

Toilet is of the bucket type in which polyethylene bags are used to dispose of waste matter. These should be tied at the neck and placed in the garbage can in the entrance way.

Other waste matter from cooking, leftover scraps of food, etc., should be similarly disposed of in polyethylene bags in the garbage can.

Arrangements for disposal of waste water must be made either to the existing basement drainage or once again, by placing in lidded cans until it can be disposed of.

Food and Water

As mentioned above, provision has been made in the shelter design to store food. This space will hold sufficient food supplies to meet the requirements of the occupants for 14 days.

A minimum of one gallon per day of water necessitates a great deal of storage space, it is therefore recommended that water only for the first 48 hours be stored within the shelter. After 48 hours, it is anticipated that the outside radiation will have dropped to a sufficiently low level to permit visits to other parts of the basement to get water from water tanks and previously filled wash tubs. Water and food will not be contaminated by radiation.

Period of Occupancy

The shelter should be occupied on the receipt of a fallout warning. It must not be vacated until instructions have been issued by local civil defence authorities. While the shelter is stocked for an occupancy of 14 days, it is anticipated that in some areas, personnel may be released from shelter after a relatively short period of time while in others it may be necessary to occupy the shelter for the full period. Only local radiation conditions will establish the period of occupancy and this, therefore, cannot be pre-determined. It is essential that some form of battery-operated radio is available and working within the shelter so that instructions may be communicated to the occupants. In most cases, it may be possible to permit short visits to the basement and even to other parts of the house after the first 48 hours but this type of information will form the subject of instruction broadcast over the emergency broadcasting system.

General

A large number of the items which are required to furnish the shelter are normally available in the house and can be brought into the shelter at the time it is occupied.

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ECONOMIC ACTIVITY UNDER NUCLEAR ATTACK



R. J. Loosmore, Economic Planning Officer, Emergency Measures Organization, concludes his examination of economic activity during a national emergency.

Conclusion

AN attack on Canada with nuclear weapons would give rise to severe economic problems. The general nature of these was outlined in Part I of this article,

which was published in the April 1961 issue of the "EMO National Digest". For more detailed study, individual reviews can be made in the major fields of economic activity. These include:

- Supply
- Transportation
- Communications
- Accommodation
- Finance
- Manpower.

The problems likely to be found in the field of supply other than production on the farm and the catching and landing of fish, were the subject of an article "Emergency Supply Planning" by Mr. J. C. Morrison in the November 1960 issue of "Civil Defence—Canada", and they will not be discussed further here.

Agriculture would be likely to suffer less destruction under nuclear attack than the manufacturing industries, but contamination by fallout could seriously affect land, crops and livestock. Farmers would need expert advice and assistance in dealing with the fallout problem, and measures might have to be taken to expand agricultural production rapidly in areas free from contamination. The continuation of agricultural production on an adequate scale would depend on the supply of key items such as seed, fertilizer, gasoline and spare parts for machines. For some of these essentials, particularly gasoline and spare parts, the farmer would be in competition with other claimants.

Success in meeting the problems of supply would depend on the availability of transportation, which could be scarce, especially during the shock phase. At the same time the ability of trucks, railways, ships and

aircraft to maintain service would depend on the continued supply of fuel and other key items.

The extent to which transportation services might be disrupted by blast, fire and fallout, cannot be predicted with any certainty, but some areas might be cut off for a time.

Different forms of transport are vulnerable to varying extents. The road transport industry has considerable flexibility and its facilities are widely dispersed. Because of this, it would have a major role to play during the shock phase.

The effects of attack could be much more severe on the railways. The main lines pass through the areas most likely to be attacked, and rolling stock, major repair facilities and marshalling yards tend to be concentrated in these areas. If track is destroyed, alternative routes are harder to provide than in the case of roads.

Inland water transport could be used for the movement of supplies after an attack which occurred during the inland navigation season, and coastal shipping would be available at all times of the year. Any damage which occurred to locks, canals and other narrow waterways would reduce the usefulness of shipping. The availability of harbour facilities would be a critical factor.

The use of aircraft for transportation after a nuclear attack would be limited by their small load-carrying capacity and their heavy fuel consumption. However, they might be used for the movement of key personnel and the delivery of urgently needed items.

Communications of all types play an essential part in the working of the economy. The usefulness of the telephone and telegraph for the conduct of business does not need any emphasis. The radio and television networks, by spreading information, help to provide the background of knowledge against which economic activity goes on. Maintenance of the telecommunications network would be essential to the effective rehabilitation of the economy after a nuclear attack.

Other communications are also essential to the economy. Postal services, for instance, play a very significant part in keeping the nation's economy going.

Newspapers too have an important part to play. Written information would have to be kept moving with reasonable speed.

Accommodation for housing, industry and government would be in short supply after an attack. The most pressing immediate problem would be to provide emergency lodging for the homeless. This would have to be done locally by making the best possible use of whatever accommodation was available.

Once the shock phase was over, the population would need to be rehoused on a less temporary basis. The scope of this problem would depend largely on the extent to which the population of damaged areas survived. It would be necessary to decide what houses should be repaired and it might be necessary to improvise housing from other types of existing accommodation. A long-term programme for the construction of dwellings and other types of accommodation would form a basic part of any recovery programme.

Accommodation might be needed for various types of economic activity such as manufacturing and distribution. It might also be needed by governments for such purposes as hospitals, or offices from which to operate public services formerly carried out in damaged areas.

Financing the necessary activities outlined above, together with many others, would present difficulties as a result of the disorganization of existing financial relationships, and of the machinery of finance. Keeping the monetary system in working order might itself be difficult. The supply of currency might be out of balance, with some areas not having sufficient to finance current transactions. Many banks might be destroyed or otherwise unable to function. There could be difficulty in transacting business through out-of-town bank accounts because of uncertainty about damage to banks and their assets elsewhere.

The payment of salaries and other contractual obligations might be physically impossible for a time in some parts of the country and many types of economic activity might therefore tend to stop. Many people would be left without money because they were in a different place from their financial resources, or because they were denied access to them.

Losses of life and property could create serious problems of compensation and at the same time some insurance companies might have their facilities and records destroyed. In any case, they would not be able to meet the enormous claims which might be made upon them for some time.

Governments at all levels would need funds to meet their current expenditures, and to make various emergency payments to those individuals whose current needs were not being met by public arrangements. The collection of taxes could be extremely difficult, particularly during the immediate post-attack period, and

revenues from damaged areas would probably be non-existent. This situation might call for new and special taxes.

Despite the difficulties involved, it would be desirable to keep the economy on a monetary basis as far as possible. To do this, some unusual financial procedures might be needed, such as a general or partial moratorium on debt payments. Among other measures, strict control of prices, rents, wages and salaries would probably have to be introduced as soon as possible. It would be necessary to use the welfare services to support a large number of people rendered temporarily insolvent, which might well involve the free issue of essential commodities and the free provision of accommodation and other essential services.

The provision of manpower to carry out essential economic activity would be a determining factor in our ability to survive a nuclear attack. There would be urgent new jobs to be done in the shock phase, and people would have to be found to do them immediately, not days or weeks later. At the same time, many existing occupations would become so important that those engaged in them could leave only at the risk of jeopardizing the whole economy. A major effort would be required after an attack to locate and identify people with specific skills and to match these skills with the jobs to be done.

In all fields of economic activity after a nuclear attack, the problem confronting government would be that of fast action in a drastically changed situation, the precise details of which could not be foreseen. The measures necessary to readjust the economy to post-attack conditions are therefore being planned in peacetime, so that they could be applied immediately if the need arose.

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HUNGARY

Civil Defence Training for Hungarians

According to a despatch from Budapest, General Lajos Cinege, Minister of Defence, told the Hungarian National Assembly when it opened on 1st December, that men were to be conscripted into the Army at the age of 18 instead of 21.

He was announcing a new Defence Law, and said the call-up age was being lowered so that young men could begin their three years' compulsory military service immediately after leaving school, rather than have to interrupt their careers later.

He further stated that all men aged between 14 and 55, and women aged between 14 and 50, would have to undergo 60 hours of Civil Defence training.

(From *The London Times*, 2.12.60.)

● NUCLEAR WEAPON EFFECTS

Dr. E. E. Massey of the Defence Research Board concludes his article on the effects of nuclear weapons.



Radioactivity Effects

7HE particular kind of radioactivity we are most concerned with is gamma radiation. This is much like very powerful X-rays. It travels in straight lines with the speed of light and will readily penetrate opaque materials.

When an atomic bomb is detonated, gamma radiation is emitted. It is this which is largely responsible for the *initial nuclear radiation hazard*. If people receive enough gamma radiation, they may get sick or even die, but it is important to remember that this gamma radiation does *not* make anything or anybody radioactive. For a nominal, or 20 kt, weapon the gamma dose at one mile from the explosion would be sufficient to cause only sickness in exposed people. With larger and larger weapons the importance of initial radioactivity becomes less and less by comparison with the blast and thermal effects.

Simultaneously with the emission of the initial radioactivity a large number of radioactive elements are produced by the fission of uranium or plutonium. These compounds are collectively called fission products. At the high temperature of the fireball we can assume that all these are vapourized and that as the fireball cools they condense to produce a fine dust. This dust is a continuing source of gamma radiation.

If the weapon bursts at such a height that the fireball does not touch the ground, the fine radioactive dust is carried into the stratosphere, gets diluted, and gradually settles out over a long period of time and over a wide area, and causes no hazard. If, however, the fireball touches the ground, then particles of dirt are drawn up with the fireball and cloud. The fission product dust may condense on, or stick to, this dirt, and the particles, being much larger, settle out before they are diluted and carried long distances in the stratosphere, this is called "fall-out" and constitutes the main source of the *residual radioactivity hazard*. The worst condition arises when the weapon bursts in contact with the ground. With increasing height of burst the fallout becomes progressively less. When the burst is higher than one tenth of the fireball radius, the weapon no longer causes a crater. It might be expected then, that for bursts in this altitude region, a sharp reduction in fallout intensities would occur.

Because the gamma radiation given off by the radioactive dirt has a range of several hundred feet in air, it is not necessary to come into contact with the dirt to be subjected to the external hazard from its radioactivity.

Stopping gamma radiation is not as simple as stopping thermal radiation. More massive amounts of shielding are necessary. A term frequently encountered in discussing radiation shielding is "half thickness layer". This means: that thickness of material which reduces the intensity of radiation passing through it to 50% or $\frac{1}{2}$. Two half thickness layers (whether in contact or not) reduce intensity to $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$; n layers reduce to $(\frac{1}{2})^n$. The half value layer of concrete for initial radiation is about 4 inches, and for residual activity about 2 inches.

In addition to gamma radiation, neutrons are emitted at the time of explosion, and fission products emit beta particles. Unfissioned bomb material will emit alpha particles. Neutrons have a somewhat shorter range than gamma radiation, but have similar effects on people, and have the power to make certain substances radioactive. Thus, neutrons contribute to initial radiation, and may contribute to residual radiation if the target is within neutron range of the burst.

The range of beta particles is only a few yards in air. Therefore, they contribute mainly to residual activity. There is a risk of serious burns if beta emitting materials are allowed to remain in contact with body tissue. Alpha particles do not penetrate the skin so they constitute a hazard only when alpha emitters are taken into the body.

One prominent feature of radioactivity, which comes about from the very fact of being radioactive, is that it gradually decays. Every radioactive substance has its own rate of decay, which is invariable, and is expressed as the time required to lose half of its activity. This is called the "half life".

Fission products being a mixture of many radio-isotopes have no definite half life. The half life increases with age. Its decay is more complicated and the decay can, in general, be expressed by the statement: For a sevenfold increase in age the activity of fission products

is decreased tenfold. This is a simplification of what is expressed mathematically by the equation:

$$I_t = I_1 t^{-1.2}$$

where I_t is intensity at time t

I_1 is intensity 1 hour after explosion. Putting this into specific values, it means, for example, that if the activity at a certain place at

Z+ 1 hrs. is	1000r per hour
then at	
Z+ 7 hrs. it will be	100r per hour
Z+49 hrs. it will be	10r per hour
Z+ 2 weeks it will be	1r per hour
Z+ 3 months it will be	0.1r per hour

This is not an absolute rate of decay—only a guide—and in actual tests quite a range of decay rates has been observed. Moreover, it does not take into account the reduction in intensity which may be caused by wind and rain erosion. In forecasting exposures from the time of a specific instrument reading it may lead to high estimates, while in calculating exposures received up to the time of the specific instrument reading estimates may be low.

You can see from this how rapidly the radioactivity falls off during its early life compared to later, hence the relative value of only a few hours protection during the early life of the fission products. Fortunately, some of this protection is automatic—much decay occurs before fallout starts, and the further downwind, the greater the delay is before fallout begins.

In plotting dose rates for operational purposes they are normalized to Z+7 hours as being more meaningful than Z+1 hours, because only a very small fraction of the fallout area will have been affected at the earlier time.

For a one megaton ground burst weapon the 10r/hour Z+7 contour is about 115 miles long. In calculating the intensity-distance relationship for a different size weapon BOTH the intensity and the distance scale as the cube root of the yield. Hence, a five megaton weapon would give at Z+7 hours a length of $115 \times (5)^{1/3}$ miles for the $10 \times (5)^{1/3}$ r/hour contour i.e. 115×1.7 miles for 10×1.7 r/hr = 195 miles and 17 r/hour. If the fission yield of the weapon is one half the total yield then the intensity is reduced accordingly i.e. $\frac{1}{2}$ of 17 r/hour = $8\frac{1}{2}$ r/hour.

It follows from the decay equation that the dose received by remaining indefinitely at a place where the intensity is I_1 at time t will be $5 t I_1$, e.g. if the activity at a place 3 hours after the burst is 15 roentgens per hour, the dose received between 3 hours and infinity would be

$$5 \times 3 \times 15 = 225 \text{ roentgens}$$

In order to determine the hazard at any contaminated place it will be apparent that it is not sufficient to know the dose rate only; one must know,

too, the time since zero. This applies whether it is a question of staying where you are, or of going into a contaminated area either to work or to live. To illustrate this point, take the example I gave a moment ago of a dose rate of 15 roentgens per hour at 3 hours after burst. If at other times of reading this same dose rate were obtained (at different places, of course) we get the following:

for:

15 r/hr at 1 hr	"Lifetime" dose is	75 r
15 r/hr at 3 hrs	" " "	225 r
15 r/hr at 24 hrs	" " "	1800 r

the different here is rather striking, though, perhaps not as realistic as the dose accumulated in say, the next 24 hours. This works out to

15 r/hr at 1 hr	24 hour dose is	37 r
15 r/hr at 3 hrs	" " "	80 r
15 r/hr at 24 hrs	" " "	200 r

Dosage is accumulated as follows from Z+ 1 hour onward (in terms of lifetime or infinity dose):

From:

Z+ 1 to Z+ 3 hrs	20% of lifetime dose
Z+ 3 to Z+12 hrs	" " " "
Z+12 to Z+72 hrs	" " " "
Z+3 days to Z+6 mos.	" " " "
Z+6 mos. to Lifetime	" " " "

Here again the value of protection during the early hours is clearly demonstrated.

Some of this early protection is more or less automatic—the fallout does not occur for the most part until some decay has taken place. If this is insufficient, some degree of protection is provided by almost any building, from a factor of $\frac{1}{4}$ for the ground floor of a frame house to very high attenuations indeed, depending, of course, on the total weight of material between the individual and the contamination.

Animals

Animals are susceptible to all the effects of nuclear weapons just as humans are. However, there is one feature I should mention. There is a greater risk of animals consuming contaminated food than there is of humans doing so. This arises from the fact that they get much of their food outside instead of from protected storage, and, moreover, they cannot be instructed to segregate contaminated food and choose only that which is uncontaminated. The danger is not so much to the animal as an animal, as it is to the animal as a source of human food. For the most part the life of the animal is not long enough for the development of the long delayed effects of internal radiation hazards. The effect on food supplies, especially milk, may be serious.
